more important service rendered by the army of trained men of science, which wages ceaseless war against pestilence, flood, and famine. The scouts of this army penetrate the unknown, under conditions making no small demands on their courage, and render possible the advance of humanity. But even if sufficient regard be paid by the ordinary intelligent citizen to the material service done him by science, it can hardly be denied that he has no conception of his indebtedness on the intellectual and moral side. Yet scientific method, whenever and wherever made welcome, has imparted greater freedom and clearness of thought, has widened imagination and sympathy, and has led to a truer perception of life and character based upon concepts of law and order. Nor need we regard as a small matter the sum of intellectual enjoyment and stimulus derived from the progress of discovery. This progress would be quickened if the people met the demand of science for intelligent sympathy with its aims and methods; for active and liberal support of investigation; for national and personal action in respectful accord with the results established by investigators accredited by their fellow-workers.

But even the material benefits can be reaped to the full only by a nation prepared to recognise the truth expressed on p. 29 of Sir Ray Lankester's book:—

> "Science is no handmaiden, but in reality the master—the master who must be obeyed. The sooner and the more thoroughly the people of this country recognise this fact, and insist upon its acceptance in practice by their representatives and governors, the better for them and their posterity."

To the present writer it appears that our fitness to remain at the head of a great empire depends upon our power to "recognise this fact."

Have we this power to-day? We have not; we must seek it through the intelligent sympathy of the people. The publication of this little book suggests one means—a powerful one—to our end, viz. the publication in the daily newspapers of information and articles of a truly scientific character. These articles or notes must be written by men of wide scientific knowledge and high attainments, in order that they may be accurate and reflect truly the aims, methods and results of scientific work.

In his preface Sir Ray Lankester explains that his book is a reproduction of articles which appeared in the *Daily Telegraph* from October, 1907, to April, 1908. The author's style is clear and animated, well adapted to arrest and hold the attention of the newspaper reader. The articles relating to tropical diseases, the public estimate of the value of science, heredity, ignorance, and vivisection display a power and earnestness suited to their themes. The lighter articles convey a considerable amount of information in a chatty, reminiscent style, interspersed with biographical detail. The bit of autobiography on p. 59 is a charmingly told illustration of the experimental method. When discussing votes for women our author is less illuminating, and is perhaps as likely to make opponents as converts. We are glad that he did not confine himself to biological subjects. He concludes an effective short statement of the problems connected with the orientation of ancient temples by a remark on Stonehenge which will be echoed by readers of NATURE:—

> "The delay in examining everything on the spot and in making all that remains absolutely secure is a national disgrace."

We hope that the present volume will have many successors.

With the exception of Sir Ray Lankester's work and certain technical articles, the "scientific" paragraphs which we have read in the daily Press are far from reaching the standard which we have already indicated (or the standard reached, *e.g.*, in the case of musical criticism). Too frequently they fall to the level of burlesque absurdity—stuff which no editor would dream of publishing as serious information in regard to any other department of news. In addition to hearing the professor talk "from an easy chair," we want accurate statements of recent advances, as clear and simple as possible, relying for interest on intrinsic importance and not on "popular" dressing and sensationalism. Nor would such "news from the front" of the progress of our scientific army lack appreciative readers. The spread of scientific teaching in our schools and universities, the existence of fifty thousand members of our polytechnics, and, above all, the attention to scientific inventions which is a necessity to organisers of commercial and industrial undertakings—these guarantee the existence of a reading public able to appreciate such scientific information. Surely the time is ripe for the editors of our "dailies" to take science seriously. To find and harness a Huxley and a Helmholtz may be beyond editorial power, but it is within that power to employ men of high scientific training and to require from them contributions of first-rate quality. By so doing they would give an impulse to national progress in science. G. F. D.

THE GREAT PYRAMID.

The Great Pyramid of Gizeh; its Riddle Read, its Secret Metrology Fully Revealed as the Origin of British Measures. By M. W. H. Lombe Brooke. Pp. 217. (London: Banks and Son, 1908.) Price 7*s.* 6*d.* net.

THE mind of the gnostic is ever with us; it delights in founding the most far-reaching statements upon a basis of facts and dogmas which may or may not be true, but the relevance of which to the conclusion escapes the ordinary intellect. In this volume of 217 pages we have some fresh theories based on older ones about the Great Pyramid, but with a wide departure in results from those of the earlier theorists. Whatever we may conclude about the theoretical results of the late Prof. Piazzi Smyth, we all know that he was able to handle his material in a scientific fashion. This is far from the case in the present volume.

As examples of method we have (p. 29) a story of most extreme irregularity a natural boulder surface—stated to nine places of figures in its cubic

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contents; a thickness of stone doubled (for no reason) and multiplied by the power or logarithm of another quantity to get a lineal quantity; a series of different breadths in inches added together (p. 178) ×10, compared with the number of theoretic pounds in a theoretic ton; or the number of lineal inches in a dimension (p. 187) shown to be the same as the number of grains in a theoretic cubic inch of an arbitrary specific gravity. No rational sense can be attached to such processes; they are numerical coincidences, and can have no meaning. When a very large number of quantities, of multipliers, and of processes of connection can thus be handled, and a wide latitude is allowed for the exactitude of the results, there is no reason for the product ceasing at 217 pages; it might as easily be continued to infinity.

The starting point is the boss of granite—one of the well-known lugs for stone lifting, the remains of many of which may be seen on other stones in the pyramid. The dimensions of this vary from 4·7 to 5·2 inches wide, and 0·94 to 1·1 inches thick, the faces being roughly hammer-dressed. This is then assumed to be exactly five inches wide and an inch thick. It is then assumed that at its junction with the stone face it is 7×5 inches; though rounded at the top, it is assumed to be rectangular, and an assumed unit of thirty-five cubic inches is deduced, and then used as a basis for pages of subsequent theory. Any one of the certainly wrong assumptions that are made would leave the conclusion entirely in air. But it serves as an efficient basis for an elaborate gnosis, interesting as a revelation of mental method.

Matters unknown to the author are also elaborated. We read of "those most exact and artistically prepared corner sockets," which are really vague and irregular in every part except the truly flat floor. The cubic content of a socket, which is sunk in a wavy, irregular surface of natural rock, is calculated, and, ÷2, the cubic inches equal the lineal inches in a theoretic mile. The faces of the pyramid are assumed to be concave in order to fill up the corners of the rock-cut sockets, and many pages of theory result from this assumption; yet at the north-east corner the drawn line of the base can be seen running some inches within the side of the socket, showing that the face was straight.

Not only does such wishing serve instead of facts to the gnostic mind, but it may entirely obliterate facts. We read, p. 17, of "the introduction of the French metric system with complete subversion and abandonment of all our hereditary measures." Yet, strange to say, the old English mile is two kilometres, the furlong 200 metres, the chain 20 metres, and the fathom two metres, or building yard one metre, within the small uncertainty of our knowledge; and this system is based on a foot, which was not only known widely in the north back to Roman times, but was known to foreigners in Egypt for thousands of years earlier. It is curious that the metric system was thus closely anticipated, and it is exactly contrary to our author's statements.

Points at issue might be raised innumerably, but it would be useless to do so. The type of mind that is nourished by such material transcends the usual limits of facts and proofs, and remains for us as one of the interesting specimens in the museum of psychology.

W. M. F. P.

THE ANTHRACITE OF SOUTH WALES.

The Coals of South Wales, with Special Reference to the Origin and Distribution of Anthracite. By Aubrey Strahan and W. Pollard. Pp. vi+78. Memoirs of the Geological Survey of England and Wales. (London: H.M. Stationery Office, 1908.) Price 1s. 6*d.*

THIS memoir gives the results of an investigation into the character of the coals of South Wales. The collection of the material was begun in 1901, and the work has now so far progressed as to lead to an opinion as to the relative distribution of anthracitic and bituminous coals, and as to the origin of the difference between them. The results published include not only the analyses made for the purposes of the investigation by Mr. Pollard, Mr. E. G. Radley and Mr. C. A. Seyler, but also all previous trustworthy analyses of coal from recognisable seams. The total number of analyses is 203. In each case the particulars given include the local name of the seam, the colliery, the authority, the percentages of carbon, hydrogen, oxygen and nitrogen, the ratio of carbon to hydrogen, the percentages of volatile matter, and ash, the specific gravity, and the fuel ratio or the relation of fixed carbonaceous residue to volatile matter.

In view of the importance of considering the analyses of each seam separately, it was necessary to correlate, so far as possible, the seams of one part of the coalfield with those of another. The sequence of the seams has consequently received careful attention, and a plate of sections is given showing the position and correlation of the seams. The different bands of the same seam are compared, and the results are given of a comparison of different samples from the same seam in the same locality, as well as of different seams in the same locality. Other chapters deal with the analytical methods employed, with the accuracy of coal analyses and with the classification of coals.

Of the ten plates accompanying the memoir, five are iso-anthracitic charts designed to show areas of equal anthracitism in each seam or group of seams. The degree of anthracitism of each sample is expressed by the factor representing the relation of carbon to hydrogen. Among previous investigators there is a general agreement that the anthracitic character of the coals in part of the coalfield has resulted from a change effected upon coals which had been originally bituminous. Three explanations of the change have been put forward:—(1) that the anthracitic seams have been more deeply buried and consequently exposed to a higher temperature; (2) that they have been altered by adjacent plutonic rocks; and (3) that they are more affected by slip-cleavage. To these three theories there are serious

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